



NOAA Office of Ocean Exploration Quick Look Report

Expedition Title: Autonomous Rapid High Resolution Mapping of Ancient Deep Water Shipwrecks and Geologic Features

Results (please check all disciplines in which this cruise collected data)	Details (please describe any novel discoveries in the discipline, answers such as “possible, awaiting data analysis” and “no apparent discoveries” are acceptable)
Bathymetric Mapping <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	This expedition conducted multibeam sonar mapping of sites off Milos Island using the R/V Aegaeo’s hull mounted sonar. Other mapping efforts were conducted over a limited area of a shipwreck site off Andros Island using the sonar on the SeaBED AUV. HCMR retains the multibeam data from the R/V Aegaeo and WHOI is processing the Andros data to develop a map of the shipwreck site.
New Species Discovered <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Without a dedicated biologist on board it is not clear if any new species were discovered. The science team generally believes that all organisms seen are already known.
Bio-prospecting <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	No efforts were made in this area.
Habitat Range Extended <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	All species and habitat ranges were within understood norms, as far as the science team can determine without a biologist.
Chemical Processes <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Several interesting chemical processes were observed, especially through the in situ mass-spectrometer. It appears that the vent sites near Milos are cold seeps dominated by carbon dioxide rather than methane. Also hydrogen sulfide was observed in situ. This is of interest as the volatility of hydrogen sulfide in seawater makes it difficult to observe. In addition to the in situ data on this cruise, its presence was deduced by indicators such as sulfurous rocks collected by the HOV. On Santorini a supposed vent site was determined to be inactive as no unusual chemical processes were observed. A hypothesis was generated to account for the formations observed at Santorini in the absence of typical vent chemistry. It is possible that they are related to the high concentrations of iron in the surrounding rocks and sediments. Similar to rusticles on shipwrecks these features may be biologically driven. Further analysis is planned.
Biological Processes <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	It is unclear as to the role of biology in the Santorini site, see above.
Geologic Processes <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Vent sites were observed by HCMR geologists through multibeam maps and in situ dives with the HOV. The results of these investigations are unclear pending further review of the sonar data and analysis of the samples collected.
Physical Processes <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	No significant physical oceanographic phenomena were observed.
Sub/ROV/AUV Dives <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	HOV dives occurred daily during this expedition. These dives approached all the science areas of this project including chemistry, geology and archaeology. AUV dives were also conducted, primarily to collect data and create multibeam maps of the Andros shipwreck site.
New Technology <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	This cruise took advantage of a variety of advanced technologies. Improved navigation systems and the in situ mass-spectrometer, Gemini, dramatically improved the output of the HOV. Addition of WHOI sampling systems also enhanced the HOV. Precision navigation also allowed the HOV and AUV to be operated simultaneously, demonstrating especially efficient operations within a limited ship-time window for archaeology. While the new, exceptionally high-resolution cameras on the AUV were not able to collect a photomosaic the AUV itself demonstrated its ability to collect high resolution bathymetry very quickly. Overall the technology of this project enabled a short cruise, 10 days with many transits and weather delays, to yield scientific results comparable to much longer projects using conventional tools. The pace, scope and efficiency of exploration were improved through this technology.
Maritime Cultural Heritage <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	While the 500 m deep wreck at Kythnos was not examined (due to weather) a significant accomplishment was the issuance of all required permissions to explore shipwrecks in Greek waters despite significant resistance to allowing Americans such access. Weather and schedule did allow some investigation of a shipwreck in shallower water at Andros. This wreck appears to be a Roman merchant ship, which is significant because it is the first Roman merchant ship found in the Aegean. This portion of the cruise also served to highlight the power of the combined HOV, AUV systems, new in situ

	instruments, and precision navigation.
Outreach <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Outreach included a visit by Greek school children and presentations offered at the Nomokos conference center on Santorini. This cruise made a diligent effort to support the NOAA Ocean Explorer web site efforts. Logistic constraints, particularly the limited bunk space, and the need to balance the relationship with Greek partners provided an added challenge to this effort. The co-PIs look forward to working with NOAA OE to wrap up the expedition web site in a satisfactory manner.
Students Involved <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Greek school children visited HCMR during the cruise mobilization. Two graduate students from WHOI also participated in the cruise. This was the first at-sea experience for one of these students.
Multidisciplinary <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	This project was inherently multidisciplinary. The highlight example is the use of the HOV to simultaneously collect chemical and optical data over the Andros wreck. The careful navigation should allow this attention to yield precise chemical maps and photomosaics. Further processing is required before such products will be available.
Exploration of New Regions <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	The Milos sites were previously unexplored by HCMR or, to their knowledge, any other teams. Suggestions had been made that there were vent sites within the Milos caldera but this investigation showed that was not true. An effort was made to locate a wreck, reported by sponge divers, near the Andros site. Limited ship time forced the conclusion of this search with no evidence found.